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1916 Race St., Philadelphia, Pa. 19103

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Standard Method for Evaluating Water Testing Membrane Filters for Fecal Coliform Recovery¹

This standard is issued under the fixed designation D 3508; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

^{e1} NOTE—Editorial changes were made throughout in March 1983.

^{e2} NOTE—Editorial corrections, including the addition of 1.3, were made in March 1989.

1. Scope

1.1 This method covers the evaluation of water testing membrane filters intended for use in the determination of the degree of fecal pollution in water by the fecal coliform test. The method described is intended to determine the specific culture recovery characteristics of membrane filters intended for determining the concentration of fecal coliform organisms in water.

1.2 This method is applicable to the evaluation of any microporous filter intended for use in the fecal coliform test in water. Its range covers any pore size filter which may be useful in the application described.

1.3 *This standard may involve hazardous materials, operations, and equipment. This standard does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 1128 Method for Identification of Types of Microorganisms and Microscopic Matter in Water and Waste Water²

D 1129 Definitions of Terms Relating to Water³

D 1193 Specification for Reagent Water³

D 2777 Practice for Determination of Precision and Bias of Applicable Methods of Committee D-19 on Water³

3. Terminology

3.1 Description of Terms:

3.1.1 *fecal coliform*—a gram negative, rod-shaped organism that ferments lactose to produce acid and gas at a temperature of $44.5 \pm 0.2^\circ\text{C}$. In this test method, a fecal coliform is any blue colony grown on the membrane filter or spread plate at $44.5 \pm 0.2^\circ\text{C}$, which grows and produces gas in EC broth at $44.5 \pm 0.2^\circ\text{C}$, and is cytochrome oxidase negative.

¹ This method is under the jurisdiction of Committee D-19 on Water and is the direct responsibility of Subcommittee D19.08 on Membrane and Ion Exchange Materials.

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² Discontinued; 1981 Annual Book of ASTM Standards, Part 31.

³ Annual Book of ASTM Standards, Vol 11.01.

3.1.2 *raw sewage*—sewage collected prior to any treatment process.

3.1.3 *polluted water*—untreated raw water containing fecal wastes.

3.1.4 *refrigeration*—storage at $4 \pm 2^\circ\text{C}$.

3.2 *Definitions*—For definitions of terms used in this method, refer to Definitions D 1129.

4. Summary of Method

4.1 Five different untreated water samples (four polluted waters and one raw sewage) are aseptically collected, serially diluted (when necessary to reduce concentration), filtered through test membrane filters using five replicates per sample, cultured on the selective medium, M-FC Agar, and incubated at $44.5 \pm 0.2^\circ\text{C}$ for 22 to 24 h. At the same time, aliquots of the water samples are cultured by the spread plate technique under the same test parameters. The blue colonies are counted on both membranes and spread plates. A representative number of blue colonies are then selected and verified, using lactose broth and EC broth for confirmation.

4.2 By comparing replicate membrane filter counts with replicate spread plate counts, the recovery rate of fecal coliforms on test membrane filters can be determined.

5. Significance and Use

5.1 The test procedure described is significant in qualifying membrane filters for use in testing water samples for fecal coliform concentration. It is most useful in locating those membranes which are not satisfactory in permitting the growth of viable fecal coliform organisms, so that the true level of fecal contamination of a water sample can be demonstrated.

5.1.1 The test described is applicable to quality control testing of membrane filters as a control in the manufacturing process, and may also be applied in specification testing of membrane filters intended for use in fecal coliform tests.

5.1.2 A confirmation procedure is provided with the method to confirm the validity of the sample sources employed, and to improve the accuracy of the test method by eliminating samples with a high percentage of false positives.

6. Apparatus

6.1 *Filtration Units for Membrane Filters*, with flask and tubing.

6.2 *Vacuum Source*.